

***Davenportia* R.W.Johnson, a new genus of Convolvulaceae (*Merremieae*) from central Australia**

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Summary

Johnson, R.W. (2010). *Davenportia* R.W.Johnson, a new genus of Convolvulaceae (*Merremieae*) from central Australia. *Austrobaileya* **8(2)**: 171–176. *Davenportia* R.W.Johnson is described as new. It differs from existing genera in the tribe *Merremieae* in its pollen morphology, hair type and bracteoles. *Ipomoea davenportii* F.Muell. is transferred to the new genus with the new combination *Davenportia davenportii* (F.Muell.) R.W.Johnson. Descriptions, illustrations and a distribution map are provided for *Davenportia* and its sole species.

Key Words: Convolvulaceae, *Davenportia*, *Davenportia davenportii*, *Merremia*, Australia flora, new genus, taxonomy

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Introduction

Mueller (1868) described *Ipomoea davenportii* F.Muell. from a specimen collected by J.McDouall Stuart on the Davenport Range, Northern Territory. He highlighted its stellate tomentum on the foliage. Bentham (1869) noted that the fragmentary specimen he studied was very different from other species of *Ipomoea*. Hallier (1893) transferred *Ipomoea davenportii* to *Merremia* Dennst. ex Endl. on the basis of its smooth pollen.

Merremia davenportii has always fitted uncomfortably within the genus *Merremia* and is worthy of generic rank based on the presence of hexapantoporate pollen (the primary distinguishing character), stalked multiangulate stellate hairs and large bracteoles.

Taxonomy

Davenportia R.W.Johnson, **genus novus** differt ab omnibus aliis generibus in Convolvulaceis combinatione characterum sequentium: stylis singulares, indivisi, stigmata globosa, pollinis grana laevia pantocolpata, pili stellati et bracteolae prominentes.
Typus: *Davenportia davenportii* (F.Muell.) R.W.Johnson.

Herbaceous perennial vines with stalked, multiangulate stellate hairs; stems trailing and climbing, twining at the tips. Leaves petiolate, compound; leaflets crenate or lobed. Inflorescence an axillary, 1–few-flowered cyme; bracteoles prominent, persistent. Sepals 5, free, herbaceous, $\pm$ equal. Corolla funnel-shaped, white; limb shallowly 5-lobed; mid-petaline bands distinctly veined and glabrous outside. Stamens 5, included; filaments at the base adnate to the corolla tube; anthers straight; pollen 6-pantocolpate, smooth. Disk annular. Ovary glabrous, 4-locular; ovules 1 per locule; style 1, entire; stigma biglobular. Fruit capsular, globular to depressed globular, 4-valved; 4-seeded. Seeds smooth, sericeous.

Distribution: *Davenportia* is a monospecific genus, endemic in Australia.

Relationships: *Davenportia* possesses a single style and globose stigmas, pinnate venation and a capsular fruit and can be classified within the tribe *Merremieae* D.F.Austin. Austin (1973) informally proposed a tribal grouping, “*Merremioides*”, to include the genera *Merremia*, *Aniseia* Choisy and *Operculina* Silva Manso, all which occur in Australia. He suggested this group had common ancestry with the *Ipomoeae* Hallier f. and *Argyreieae* Choisy ex G.Don. Austin (1982) formally described the tribe *Merremieae*; however, Stefanovic

et al. (2002) demonstrated that the tribe was not monophyletic and transferred *Aniseia* and some tropical American genera to a new tribe *Aniseieae* Stefanovic & D.F.Austin. Further studies indicated the genera remaining in the tribe *Merremieae*, mainly of the old world tropics, may also not be monophyletic (Stefanovic *et al.* 2003).

The type genus of the tribe *Merremieae* is *Merremia*. Austin & Staples (1980) described a new genus *Xenostegia* D.F.Austin & Staples based on *Merremia* section *Halliera* O'Donnell. *Davenportia* is another segregate of *Merremia* that is sufficiently distinct to warrant generic rank.

Diagnostic Characters: The following characters separate *Davenportia* from other members of the tribe *Merremieae*.

Pollen. Pollen morphology has played an important role in the classification of genera in the family Convolvulaceae (Ferguson *et al.* 1977). Pollen grains of *Davenportia* are smooth, spheroidal and hexapantocolpate (Fig. 1). The polar axis ranges from 60–70 μ long; the equatorial diameter 65–70 μ . The colpus length ranges from 25–55 μ and width from 4–10 μ . Ferguson *et al.* (1977) did not record pantocolpate pollen in the 55 species of *Merremia* and *Operculina* they studied. They did, however, record *Merremia davenportii* as having tricolpate pollen. Numerous SEM images of pollen of *Davenportia* showed that from some angles the pollen may appear tricolpate. Measurements from 10 sample pollen grains all showed the pollen was hexapantocolpate, though the possibility exists that some tricolpate grains may occur. Telleria & Daners (2003) also recorded no pantocolpate pollen in *Merremia* in their study of southern New World Convolvulaceae. However, Leite *et al.* (2005) found occasional pantocolpate pollen grains in some typically tri-zonocolpate members of *Merremia* section *Cissooides* O'Donnell from South America.

Vestiture. The presence of stellate hairs, which in this case are stalked and multiangulate with numerous arms, distinguishes this taxon from all others species of *Merremia* in Australia and South East Asia. Stellate hairs are rare, but not unknown in *Merremia* species from



Fig. 1. Pollen grain of *Davenportia davenportii* from Wilson 4717 (BRI).

elsewhere. A new genus *Astromerremia* Pilg. was erected by Pilger (1936) on the basis of it having stellate indumentum. Pilger listed only one species from Angola in his new genus inferring no other species of *Merremia* had stellate hairs. Verdcourt (1958) stated that if stellate hairs were the chief reason for separating *Astromerremia* from *Merremia* then he considered it difficult to maintain the new genus. He did conclude that the new species had previously been described from Angola as *Merremia stellata* by Rendle (1908) and sank the new genus. Rendle stated that it was the only *Merremia* with stellate hairs. Its hairs are stalked, multiangulate, with numerous arms. Austin & Staples (1983) reported the presence of stellate hairs in a few species from South America. They described *M. repens* which has simple to 3-branched stellate hairs and commented that stellate hairs were seen in some varieties of *M. digitata*. Simao-Bianchini & Pirani (1997) describe a number of species of *Merremia* from South America with stellate hairs but all have tricolpate pollen and small bracteoles. Stalked stellate hairs do occur in a number of other genera in Convolvulaceae.

Bracteoles. The bracteoles of the Australian species of *Merremia* are small, up to about 5 mm long. In *M. davenportii* they are prominent and 6–20 mm long. In Malaysia

some species of *Merremia* section *Hailale* Hallier f. may have foliaceous bracteoles (van Ooststroom 1953). However, their hairs are not stellate and their pollen is uniformly 3-colpate (Ferguson *et al.* 1977). The South American species referred to above all have smaller bracteoles.

Notes: *Merremia* has long been regarded as a morphologically diverse genus (Austin 1973; Austin & Staples 1980) and the limited molecular evidence to date indicates the internal disposition of genera in *Merremieae* to be unresolved (Stefanovic *et al.* 2002, 2003). It is apparent that a number of character states have evolved independently across the wide pantropical range of the genus. Stellate hairs of various structures have evolved independently in Africa, Australia and South America. This supports the argument presented by Verdcourt (1958) that erection of the genus *Astromerremia* on the basis of stellate hairs alone is not sustainable. The evolution of hexapantoporate pollen in *Davenportia* in Australia has not been previously reported in *Merremia* throughout Africa and Australasia. The occasional occurrence of some pantocolpate pollen in a few zonocolpate species in South America is further evidence of independent evolutionary trends. The combination of hexapantoporate pollen (the primary distinguishing character), stalked multiangulate stellate hairs and large bracteoles represents an independent evolutionary development which clearly warrants recognition as a new genus. Similar character suites have been used to justify the erection of other Convolvulaceae genera such as *Xenostegia* (Austin & Staples 1980) and *Odonellia* Robertson. As noted by Robertson (1982) many genera in the Convolvulaceae have been defined on single or few characters, reflecting many instances of reticulate and/or convergent evolution.

Etymology: The name of this genus is derived from the specific epithet, *davenportii*, which was used by Mueller in recognition of the locality 'Davenport's Range', from which the type specimen was collected. The Davenport Range is named after the wealthy landowner and parliamentarian Sir Samuel Davenport (1818–1906) (Nicks 1972).

Davenportia davenportii (F.Muell.) R.W. Johnson **comb. nov.**; *Ipomoea davenportii* F.Muell., *Fragm.* 6: 97 (1868), as *I. davenportii*. **Type:** "Davenport's Ra." [Davenport Range, Northern Territory], *s.dat.*, J.M.Stuart *s.n.* (holo: MEL2288129).

Merremia davenportii (F.Muell.) Hallier f., *Bot. Jahrb. Syst.* 16: 552 (1893), as *M. davenportii*

Perennial, becoming woody at the base; stems trailing to climbing, twining at the tips, densely stellate hairy, hairs stalked, multiangulate with many arms to 1 mm long. Leaves petiolate; petiole 4–35 mm long; blade trifoliate, appearing almost 5-partite with lateral leaflets deeply lobed on the outer margin; leaflets petiolulate; petiolules 1–8 mm long; terminal lobe elliptic to obovate, occasionally ovate-elliptic, 12–50 mm long, 10–30 mm wide, base tapering, occasionally obtuse, margin crenate, occasionally shallowly lobed, apex obtuse to rounded, emarginate, mucronulate, densely stellate hairy, pinnately veined with 4–8 pairs of secondary veins; lateral lobes similar but shorter and with a distinct basal lobe on the outer margin. Inflorescence axillary, cymose, 1, rarely 2-flowered; peduncle 6–40(–60) mm long; bracteoles opposite, linear to narrowly elliptic or obovate, occasionally ovate, 6–25 mm long, 1–5 mm wide, finely acute to long-acuminate, densely stellate; pedicels 10–30 mm long, dilated upwards. Sepals subequal, ovate to ovate-lanceolate, 12–25 mm long, 5–7 mm wide and up to 10 mm wide at fruiting, apex acute to long-acuminate, densely stellate; inner sepals with a distinct glabrous scarious margin. Corolla funnel-shaped, c. 30 mm long, 20–40 mm diameter, white; petals 35–45 mm long, midpetaline band glabrous, with 5 dark nerves. Stamens 5; filaments adnate to the base of the corolla tube for 4–7 mm, free for 10–18 mm, hairs simple occurring on fused area and to above the point of attachment; anthers narrow oblong-lanceolate, sagittate, 4–4.5 mm long, splitting longitudinally; pollen smooth, pantocolpate with 6 colpi. Style 20–30 mm long, glabrous; stigma biglobular. Capsule globular to depressed globular, 6–12 mm long, 9–14 mm diameter, straw-coloured, glabrous, 4-celled, splitting longitudinally

into 4 valves; seeds dark brown to black, $\pm$ globular, 5–6 mm long, densely sericeous, hairs to 0.75 mm. **Fig. 2.**

Additional specimens examined: Western Australia. c. 10 km S of Boodarie Homestead on track from PWD water tanks, Apr 1995, *Mitchell PRP311* (BRI); Barn Hill Homestead, Apr 1993, *Mitchell 3023* (BRI). **Northern Territory.** Dixon Creek, 9.2 km N of Devils Marbles, May 2005, *Bean 23827* (BRI); Morphett Creek, Mar 1955, *Chippendale 995* (BRI); Stuart Highway, 12 km S Newcastle Waters turnoff, Oct 1995, *Cowie 6078* (BRI); Burrabelly waterhole, Fre River, Feb 1972, *Dunlop 2494* (BRI); 10 km N of Elliott, Nov 1993, *Egan 2856* (BRI); near Wycliffe Well, c. 236 miles [380 km] N of Alice Springs, Jan 1950, *Everist 4262* (BRI); 10 miles [16 km] N of Elliott, Stuart Highway, Jan 1968, *Latz 98* (BRI);

27 km W of Barkly homestead on Barkly Highway, Jun 2004, *McKenzie RAM04/68* (BRI); 8 miles [13 km] N of Elliott, Nov 1969, *Parker 127* (AD); 22 miles [35 km] ESE of Frewena Station, Apr 1948, *Perry 670* (BRI); 20 miles [32 km] NW of Ooratippra Station, Mar 1953, *Perry 3429* (BRI); 50 miles [80 km] W of Camooweal, Jul 1958, *Trapnell 23* (BRI); c. 90 km S of Tennant Creek, Jul 1968, *Weber 1075* (BRI); Stuart Highway, 11 km NW of Elliott, Apr 1983, *Wilson 4717* (BRI). **Queensland.** BURKE DISTRICT: red sand hills NE of Barkly Downs Homestead, c. 104 km WNW of Mt Isa, Jul 2000, *Bailey & Kelman s.n.* (BRI [AQ778392]); Barkly Downs, c. 104 km WNW to NW of Mt Isa, May 2001, *Bailey & Kelman s.n.* (BRI [AQ778393]); SW corner of Pilpah Range, 12.5 km NNE of Barkly Downs homestead, Nov 2004, *Kelman DTK101104_8* (BRI).

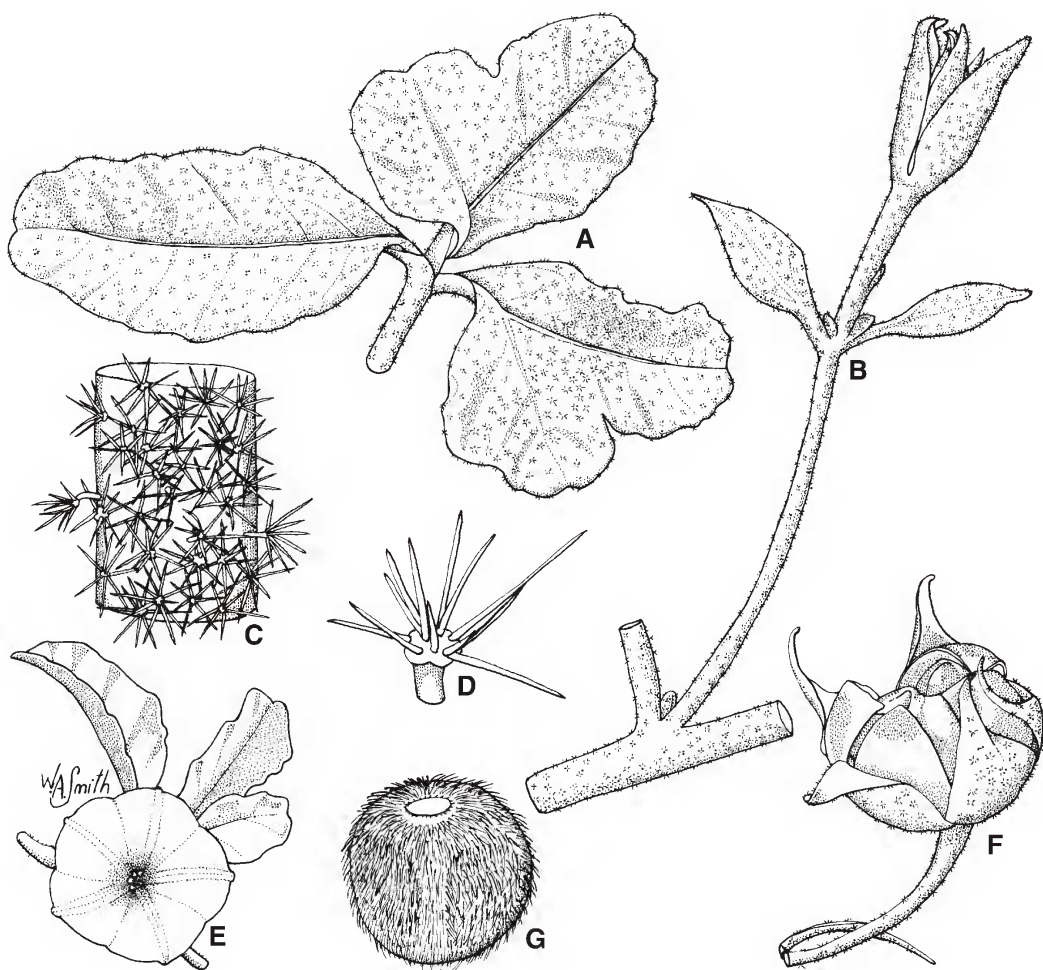


Fig. 2. *Davenportia davenportii*. A. leaf $\times 2$. B. young inflorescence showing bracteoles $\times 1.5$. C. enlarged stem showing vestiture $\times 12$. D. stalked multiangulate stellate hair $\times 50$. E. flower $\times 1$. F. fruit $\times 1.5$. G. seed $\times 4$. A, C, D from *Kelman DTK101104_8* (BRI); B from *Everist 4262* (BRI); E based on plate by Moore (2005: 413) and descriptions; F from *Bailey & Kelman s.n.* (BRI [AQ778393]); G from *Bailey & Kelman s.n.* (BRI [AQ778392]). Del. W.Smith.

Distribution and ecology: *Davenportia davenportii* occurs in coastal areas of north-western Western Australia, through the southern Northern Territory, extending into north-western Queensland. It grows on red to brown sandy soils in woodlands and shrublands, often adjoining creeks (**Map 1**).

Phenology: It flowers and fruits throughout the year, depending on moisture availability.

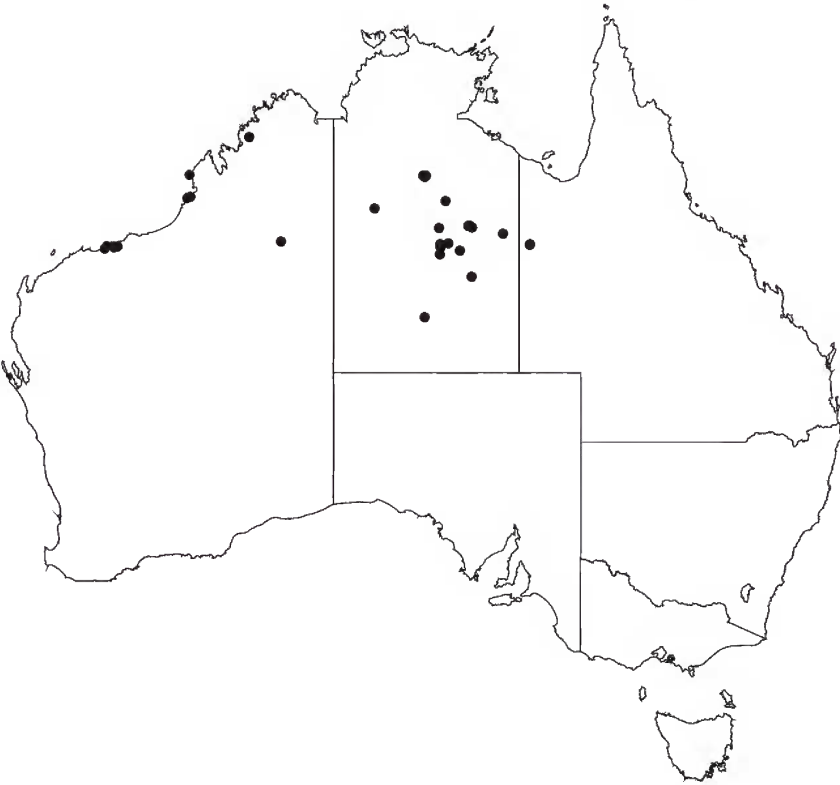
Conservation status: The species is not regarded as threatened in either the Northern Territory or Western Australia. It is known from only one population in Queensland.

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Map 1. Distribution of *Davenportia davenportii*